UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Electrification Administration
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ELECTRICITY FOR RURAL AMERICA

A brief history of the development of rural electrification through the REA program and of its socio-economic influence on rural America.

One American farm in ten had central station service in 1935; four in each ten, 2,500,000 in all, were electrified in 1943. In 1936 electricity was a means of making farm life more comfortable, farm work easier, a semi luxury; by 1943 electricity had become a valuable, almost indispensable, production tool.

That, in its most simple terms, is the history of rural electrification in the United States.

The vitality of this rural electrification movement dates from the entrance of the Federal Government into the field on May 11, 1935, when the President created the Rural Electrification Administration as an emergency agency under the powers of the Emergency Relief Act. The program soon proved itself of a substantially different character from mere job-providing, and the next year REA became a permanent branch of the Government. In 1939 it became a part of the Department of Agriculture.

The Government program operates in two ways; directly by financing the cost of installing power facilities to serve rural areas, and indirectly, by catalyzing the construction of such facilities with private capital. Although the two methods have been about equal in results as measured by the number of farms served, direct financing has been more spectacular, more tangible.

Power systems financed by the Rural Electrification Administration are now operating 380,000 miles of transmission and distribution line in 46 states, Alaska and the Virgin Islands. More than a million farms and other rural establishments are served by the 806 REA systems now in operation.

Farms served by the REA systems and the various private and public facilities total nearly two and one-half million. About four million U. S. farms, however, are not yet electrified.

When REA began its program, it was expected that the private power companies would absorb a large proportion of the loan funds appropriated to REA by Congress. But these companies declined to avail themselves of public money on a sizable scale, and it soon became apparent that extensive rural electrification would not be possible unless the farmers themselves banded together to build and operate their own systems.

The success of the program is due in large degree to the organization of local cooperatives to serve as sponsoring groups. More than 90 percent of the borrowers in the REA program are cooperatives organized and controlled by farmers for the purpose of supplying themselves with electricity on a non-profit basis.

Financial record

In the face of predictions on many sides that these systems would never be able to pay their own way, the cooperatives and other borrowers have established a splendid record of financial responsibility. The systems have borrowed $372,000,000. Approximately $40,000,000 had fallen due on the 25-year obligations up to the end of September 1943. Virtually all the systems have met their interest and principal payments, and 578 of the borrowers had made advance payments amounting to more than $14,000,000.

This record could not have been achieved if the borrowing groups had not been soundly organized or if wasteful or extravagant methods had been followed in construction and operation of the REA lines.

Organization of Cooperatives

In all the preliminary activity preceding a farm group's application for a Rural Electrification Administration loan, the participating members of the group show an interest in their project which assures its ultimate success. When the farmers of a community start out to get electricity, they lay the foundations for a continuing program of community cooperation.

Working usually under the leadership of several active local people, such as county agricultural agents or farm organization officials, the nucleus of a borrowing group is formed by farmers signing applications for service by the proposed cooperative. Meetings are held throughout the area of the proposed power system; the REA loan requirements are explained; more farmers are signed up. Each farmer who joins the proposed cooperative pays a fee, usually $5, for a membership to run as long as he takes the cooperative's service. This accumulating fund pays the expenses of completing the organization and collecting data to support the loan application.

Farmers, who make up the borrowing group, select a survey committee, usually composed of 35 or 40 persons, to supervise the initial organization work. This committee elects another committee to handle the details of incorporation and also names a group of trustees who direct the activities of the cooperative until the first annual meeting. A local attorney is retained and a project survey coordinator is employed to finish the task of getting the project in shape for REA's consideration.

The next step is to employ temporarily a competent electrical engineer to draft a map and description of the project to accompany the application for a loan. Next, the coordinator and engineer start negotiations with the nearest private power company or municipal or Government plant to obtain an economical source of wholesale power. If unable to secure a wholesale rate of about one cent per kilowatt hour, the group may apply to REA for a loan to finance their own generating plant. About 50 percent of the energy consumed on REA-financed lines, however, is supplied at wholesale by private power companies and only about 10 percent from REA-financed generating plants.

REA field representatives aid the group from time to time and transmit to REA headquarters information that has a bearing on determination of the project's feasibility. REA also assists in the preparation of tentative rate schedules and in the handling of some of the legal and engineering problems.

If REA approves an allotment of funds to the cooperative, a loan contract is

prepared for the signature of the trustees. The loan is secured by a mortgage on the lines to be built and a lien on their revenues. The individual farmer assumes no personal liability for fulfillment of the obligations of the group, nor may he hypothecate any of his property to secure the cooperative's debt.

Democratic Control

Although the board of trustees directs the policies of the enterprise, the administration of the cooperative's affairs is entrusted to a manager who is selected by the board with the approval of REA. The manager in turn is responsible for the selection of employes for stenographic, bookkeeping and other work, including line maintenance after the system is placed in operation. Experience has proved that the manager most likely to succeed is one who has some technical understanding of powersystem construction and operation as well as a record of business ability.

At the first annual meeting of the cooperative the members elect the trustees who serve for regular terms as policy-making officials. These men usually meet once each month and often devote additional time to the cooperative's affairs, at considerable personal sacrifice. They receive no salaries. Both the manager and the board of trustees present many of their problems to REA, thus drawing from the accumulated experience of the agency's existence.

Democratic processes prevail throughout the affairs of a cooperative, and members are encouraged to take an interest in their cooperative and to play an active part in the conduct of its affairs. Many new and more efficient methods were introduced into the rural distribution field in order to keep system capitalization at a moderate level, and to hold operating expenses to a minimum.

Economical Construction

Changes in the design of rural power lines effected large economies. With REA's encouragement, high-strength conductors were introduced. This permitted longer spans of wire and thus fewer poles per mile. Single-phase lines were built without crossarms, eliminating another source of high costs. And the development of "assembly line" methods, growing out of large-scale construction, resulted in economies that had not been possible under the older practice of building short extensions to existing lines.

Under wartime conditions, large-scale construction of rural power lines has been almost completely suspended, but when hundreds of cooperatives were building lines, some of them a thousand miles or more in total length, mass-production techniques were generally used. Separate labor crews went down the highways, each performing one function such as digging holes, raising poles, stringing wires and hanging transformers. Before REA, line construction costs were $1,500 to $2,000 and more per mile. Costs of REA-financed construction averaged about $750 a mile before war suspended operation, and in favorable circumstances figures below $500 a mile were attained. These reduced costs enabled the cooperatives to serve entire rural areas rather than to "skim the cream" and confine service to the more prosperous farmers in a community. Many cooperatives are operating successfully and amortizing their loans although averaging fewer than two consumers per mile of line.

Self-help to Finance Wiring and Appliances

In some of the areas where agriculture is particularly depressed or where population is sparse, a more advanced self-help program has been instituted. The typical self-help cooperative does a fairly large proportion of its own construction work instead of awarding the entire job to a contractor. Credits earned

are applied not only to the cost of house wiring, but, sometimes, to the purchase of electrical appliances and equipment and pressure water systems.

Electricity in Overalls

At least 325 different uses for electricity have been reported by farmers who receive service through REA systems. Some of them are frivolous, of course. But a surprising number are uses which reduce farm operating costs or add to net income. Although it is difficult to measure the contribution made by electricity in the building of a sounder agricultural economy and improved social conditions, farmers themselves have reported to REA that electric power has enabled them to increase production and to carry on various farm operations that would either be too costly under other methods or even impossible, especially during the period of wartime labor shortage.

On the occasion of REA's eighth birthday celebration, President Roosevelt sent the following message to REA Administrator Harry Slattery:

"...Temporarily, because of the imperious demands of war, further general extension of high lines is delayed; but I note with satisfaction that electric power already made available is playing a positive part in the program of increase of critical foods for our allies as well as ourselves; and the seventy or eighty thousand additional farms you expect to connect to existing lines during the coming year will add another chapter to the story of your war effort.

"A few more years of intensified effort will enable every farm man, woman and child in the United States, we hope, to turn on electric power or light or heat for work or comfort whenever and wherever it is needed."

The additional farm connections to which the President referred have been made possible under an order of the War Production Board approving the use of materials for service extensions from existing lines in cases where electricity could be used effectively in the achievement of production increases. Completion of 35 REA systems, which had been left more than half finished at the time the United States entered the war, also was authorized by the War Production Board on the basis of electricity's aid to farm production. WPB Chairman Donald Nelson explained this action by saying, "While this does not represent a lessening of the critical situation in the metals field, it does represent a decision to make the best possible use of materials on hand."

The same techniques that have helped produce, preserve and process greater quantities of food for the United Nations will also serve to improve the farmer's position after the war. Electric power has been particularly helpful in saving labor and increasing the yield in connection with farm "choring".

With an electric brooder, 500 chicks require little if any more time and labor than are required for 250 handled by old methods. Losses from fire are reduced and the chicks grow faster and are sturdier.

In the production of hogs many farmers report that at least one pig per litter can be saved by the use of electric brooders; Purdue University reported a 30% decrease in losses. Installed in a corner of the farrowing pen, a brooder saves the young pigs from exposure and from crushing by the sow. The most striking example in REA's files concerns a Kansas farmer who had two electric brooders in one building used for farrowing, but none in the second. His 14 sows produced litters during below-zero weather. Seven sows in the brooder-equipped building

saved all their 84 pigs; in the other building not a pig survived.

Electricity provides a means for a substantial increase in the Nation's milk supply through maximum use of existing equipment and the installation of such devices as milking machines and milk coolers and pressure water systems.

An ample supply of water is essential to maximum beef production, and water pumped by electricity requires but a fraction of the labor of pumping by hand or even by gas engine-powered pumps. Electric feed-grinders get the most out of food with the least expenditure of time and money.

Farmers who have electric pumps can irrigate vegetable gardens, and orchards during dry weather. Corn production in the Platte Valley of Nebraska has been increased from an average of 15 bushels per acre to 45 bushels with electric irrigation.

Electric refrigeration plays an important role in saving food. Electric motors also perform a vital task when harnessed to saws, hay hoists, grain elevators, grindstones, churns, cream separators, corn shellers, fruit graders, sausage grinders and farm repair shop equipment.

Some farmers have reported to REA that electric lighting in the farmyard and outbuildings makes it possible to do the chores quicker and more efficiently. In harvest season, tractors and other field equipment can be refueled and serviced after dark, thus permitting an earlier start in the morning.

Electric household appliances are saving needless drudgery and are enabling farm women to devote more time to the raising of poultry and other productive tasks.

Need for Specially Designed Equipment

The manufacture of most types of electric appliances was drastically curtailed or halted in 1942. Even before the war REA had advocated the construction of some of the simpler devices by the farmers themselves. Brooders are perhaps the most popular home-made device; others included in the make-it-yourself program are feed mixers, home fruit and vegetable dehydrators, hay hoists, wood saws and stock tank heaters. Plans for building most of these machines have been distributed by REA.

REA electrification specialists realized early in the life of the agency that the coming of electricity to vast numbers of farms would create a demand for equipment specially designed for use with electricity. Although the war halted many developments that were about to take a significant place in the appliance field, important steps have been taken to introduce devices designed to operate with maximum efficiency.

REA's role in the development of new equipment has been limited by a lack of research facilities, but members of the technical staff for years have provided guidance, suggestions and functional specifications of acknowledged value to manufacturers seeking to reach the new market created by rural electrification.

The farmer of the future may use a tractor operated by storage batteries that can be charged inexpensively at night, right from the house circuit. He may also use high frequency current to treat his soil and to exterminate ants, termites, mice, cockroaches and boll weevils. He needs, above all, the benefits of running water in the farm home and other buildings so that he may live healthfully under conditions of sanitation; and development of new pumping and pipi

...es, techniques and fixtures would usher in a great expansion of farm plumbing.

...t War Prospects

...ural electrification is expected to receive new impetus after the war when construction programs will be desirable as a means of aiding the transition to a peacetime economy. The report of the National Resources Planning Board last September included the following statement about the relation of rural electrification to public works and land use:

"It is estimated conservatively that at least 50 percent of the unserved farms and other rural users can be supplied with electricity under the financing requirements of the present Rural Electrification Administration program, assuming present technological and economic conditions. This means that over 2 million additional farms and other rural users would be supplied with electricity. This is a total equal to about twice the number that will be furnished service by the systems which has been allotted funds by the Rural Electrification Administration on June 30, 1943 when their lines are fully developed. If the amortization period were lengthened, it is probable that service could be extended to a number considerably in excess of 2,000,000. Estimates of the number of farms that can be served on a self-liquidating basis have been subject to continuous revision because of constant improvements in the field of rural electrification. Reduction in line costs, improved techniques, expanding uses of electric power on the farm and in rural areas, lower and promotional rates, the development of cooperatives - all of these dynamic factors have resulted in the discarding of earlier estimates of economical rural electrification.

"The most widespread of the intangible public benefits of rural electrification is its general contribution to the social and physical well-being of rural America. Electricity can promote the all-around improvement of rural life in many ways. Electric power releases the farmer and his family from necessary drudgery of many daily chores like the pumping and carrying of water. Some of the time thus freed is available for social and cultural activities. The effects of electric power on health are substantial because it makes possible modern plumbing, refrigeration, running water, the bathtub and the inside toilet - all of which are important contributions to sanitation. Adequate light removes an important obstacle to reading and study, and to many indoor social and community activities. Electric lights in home and school will help to save the eyes of many rural children.

"Of more strictly economic importance is the contribution that rural electrification can make to real farm income by making possible increased production for home use and for the commercial market. The application of electric power to productive farm operations has just begun because up until recent years there was not a sufficient market to encourage manufacturers to design electrical equipment and appliances specifically for productive use in agriculture.

"The possibilities of industrial decentralization which rural electrification holds out is also considered by many people as an economic and social benefit of great potential significance. Without entering into the merits of this position, it can be pointed out that the availability of electric power in rural areas certainly tends to remove an obstacle to the greater dispersion of industrial activity."